

# CLAIMS

1. A variable ratio torque converter including an input member for connection to a primary drive, an output member coupled to a torque multiplying member for connection to drive a load, the input member having paired permanent magnet poles, and the output member having a plurality of pairs of movable periphery magnets per pole, and a winding arranged for each peripheral magnet pairs, the windings being connected to a controllable inverter arranged to control torque from the torque multiplying member, the input member and the output member are arranged so that the output member rotates with the input member under magnetic force, the moving peripheral magnets causing the windings to produce a slip related control signal for the inverter to control the torque from the torque multiplying member.
2. A hybrid drive for a vehicle, including an internal combustion engine and a variable ratio torque converter having an input member for connection to the engine, an output member coupled to a torque multiplying member for connection to drive at least one wheel of the vehicle, the input member having paired permanent magnet poles, and the output member having a plurality of pairs of movable periphery magnets per pole, and a winding arranged for each peripheral magnet pairs, the windings being connected to a controllable inverter arranged to control torque from the torque multiplying member, the input member and the output member are arranged so that the output member rotates with the input member under magnetic force, the moving peripheral magnets causing the windings to produce a slip related control signal for the inverter to control the torque from the torque multiplying member.
3. The invention according to claim 1 or 2 wherein the converter further includes a slip responsive retard arrangement for retarding actuation of said peripheral magnets to thereby delay movement when there is a slip between respective speeds of the input member and the output member.
4. The invention according to any one of claims 1 to 3 wherein the input member having an input shaft with the paired permanent magnet poles fixed

thereon and the paired permanent magnet poles being arranged around one or more circular elements.

5. The invention according to any one of claims 1 to 4 wherein the peripheral magnets being arranged to move in a rotational or translational manner.

5 6. The invention according to claim 5 wherein the peripheral magnets are arranged to rotate about respective axes which are parallel to or to move laterally from the axial axis of the input member.

7. The invention according to claim 3 wherein the slip responsive retard arrangement having at least one delay zone where a peripheral magnet therein is maintained stationary and at least one actuating zone where a peripheral magnet therein is caused to move.

10 8. The invention according to claim 7 wherein the delay zone(s) and the actuating zone(s) are formed with one or more contoured surfaces arranged to provide a delay before actuating said peripheral magnets to move when there is a slip between the input member and the output member.

15 9. The invention according to claim 8 wherein the one or more contoured surfaces are in the form of a series of alternating ridges and troughs, and the sides between the series of alternate ridges and troughs are shaped to cause the peripheral magnets to accelerate to a maximum speed and then decelerates to return to stationary.

20 10. The invention according to claim 3 wherein the actuating arrangement has a first disc and a second disc coupled to rotate with the input member, each of the first and second discs having a contoured circumferential surface arranged to actuate the peripheral magnets to move after a delay.

25 11. The invention according to claim 10 wherein the peripheral magnets having a key arranged to follow a contoured surface or crank means arranged for actuation by the contoured surfaces of the first and second discs.

30 12. The invention according to any one of claims 1 to 11 wherein the torque multiplying member is a motor/generator which can be controlled to operate as a motor or as a generator.